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FLOODPLAIN MANAGEMENT RECONNAISSANCE STUDY REPORT

CARTHAGE HANCOCK COUNTY



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CITY OF CARTHAGE

HANCOCK COUNTY, ILLINOIS

FLOODPLAIN MANAGEMENT

RECONNAISSANCE STUDY

Prepared By

UNITED STATES

Department of Agriculture

Soil Conservation Service

Champaign, Illinois

In cooperation with

STATE OF ILLINOIS

Department of Transportation

Division of Water Resources

September 1985

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CITY OF CARTHAGE
RECONNAISSANCE STUDY

INTRODUCTION

Use of floodprone areas can be a severe problem in Illinois. Urbanization and floodplain encroachment are increasing the severity of this problem. Over 800 communities in Illinois have been identified as having flooding problems.

The Illinois Division of Water Resources (DWR) is the responsible state agency for urban flood control and for setting priorities of flood studies within urban areas. The Soil Conservation Service is providing assistance to the Division of Water Resources in setting these priorities. A joint coordination agreement was executed between the Division of Water Resources, State of Illinois, and the USDA, Soil Conservation Service on April 30, 1976 and revised in December 1978 to furnish technical assistance in carrying out Flood Hazard Studies. These studies are carried out in accordance with Federal Level Recommendation 3 of "A Unified National Program for Flood Plain Management", and under Section 6 of Public Law 83-566. A plan of study was executed in October 1984 for reconnaissance studies for 9 Illinois communities. These reconnaissance studies will utilize existing floodplain information, historical high water profiles, and the 100 year floodplain from flood insurance studies when available. Average annual damages are estimated for the structures within the floodplain.

This study was conducted and the report provided for the purposes of: 1) To evaluate needs for additional future studies, 2) to estimate average annual damages, 3) to provide an updated estimate of the 100 year floodplain and map, and 4) to provide guidance and recommendations to the community for improved floodplain management.

STUDY AREA DESCRIPTION

The City of Carthage is located in central Hancock County, Illinois, about 25 miles west of Macomb, Illinois, on U.S. Highway #136. The population of Carthage is 2,978, according to the 1980 census.

The transportation facilities in the area include United States Highway #136 and Illinois State Highway #94. A blacktop road and gravel road network connect the smaller villages and rural areas to the City of Carthage.

The upper end of Prairie Creek starts on the west side of the city and flows to the east through the south central portion of the city. A branch from the north flows in a southerly direction through the eastern part of the city and joins Prairie Creek in the southeast part of the city. This north branch has a drainage area of 0.5 square miles for a total drainage area on Prairie Creek of 1.7 square miles at the sewage lagoons southeast of the city. West and North of Carthage is Long Creek that flows in an easterly direction. The City of Carthage has four dams on a branch of Long Creek that are used as water supply, recreation, and sediment basin reservoirs. The drainage area of Long Creek at the junction below Carthage dam #1 is 15.7 square miles of which 3.1 square miles is controlled by the Carthage reservoirs. Prairie Creek and Long Creek both drain to the La Moine River which outlets to the Illinois River Basin, hydrologic unit #07130010, subwatershed #030.

The drainage area to the south of U.S. Highway #136 is mainly cropland, with corn and soybeans as the main crops. The drainage area to the north of U.S. Highway #136 is a combination of woodland, hayland, pasture, and cropland with corn, soybeans, and wheat as the main crops. The cropland is located on the flatter prairieland areas. The woodland, is located on the rougher, steeper, well drained areas bordering the streams with the hayland and pasture located on the moderate slopes between the cropland and woodland areas. The cropland is still farmed primarily using conventional tillage. The woodland areas close to Carthage are used for reservoirs, recreation areas, and a golf course.

The average rainfall is 35 inches per year with 65 to 70 percent occurring during the growing season. Annual snowfall is 18 to 26 inches per year.

The soils in the area of Carthage are of the Herrick-Virden association. These are deep, nearly level to gently sloping soils on upland areas. They are somewhat poorly drained and poorly drained soils that formed in loess. They are on or near drainage divides but also formed in shallow depressions and along the sides of small drainageways. These soils have a high to moderate organic matter content, high available water capacity, and moderate to slow permeability. These soils are not suited for urban uses, roads, and sanitary facilities because of their poor drainage, clayey subgrade and seasonal high water table. If the excess water is removed, they are well suited for most crops grown in the county except for some legumes.

The city water supply is from a water supply and recreation reservoir on a branch of Long Creek located on the northwest side of the city. The city has a sewage treatment plant located southeast of the city. It is located above the floodplain, but very close to Prairie Creek.

NATURAL VALUES

The Prairie Creek drainage area in the south part of the city is urban or cropland with mainly a corn and soybeans rotation. In this area wildlife cover is at a minimum with the exception of the abandoned railroad line which will probably revert to cropland eventually. In the Long Creek drainage area north and west of the city there are more ponds, reservoirs, hayland, pastureland, and woodland that provide excellent cover for wildlife and moderate sport fishing. Conventional tillage is the main method of farming with some chiseling and some no-till corn being planted into soybean stubble. Utilizing more conservation tillage, ridge till, or no-till would provide more cover for small game and when used with other erosion controlling practices could reduce the sedimentation of the reservoirs. This, in addition to preserving roadside ditches and abandoned railroad right-of-ways, would support more fish, wildlife, and plant varieties to make this a better place to live, work and play.

FLOOD PROBLEMS

Prairie Creek starts at the southwest corner of the city near a trailer park and a future industrial park. It then goes through a steep section with a very small channel and small culverts at the street and driveway crossings. The culvert at Griffith Street washed out in the Spring of 1985. In the downtown area, Prairie Creek is more defined and deeper. It comes very near two auto dealer buildings and the walls or basement walls of these buildings form one side of the channel in those areas. The Pontiac dealer had water in a west room of its building as recently as the Spring of 1985. They also had 18 inches of floodwater on the showroom floor about 1973, and indicated that floodwater was partially responsible for causing the building to burn in the 1960's. The floodwater caused sparks from a small motor to ignite some fuel in the garage where work was being done on a gas tank. The Chrysler dealer also had flooding in the spring of 1985. There is a boarded up window or opening along the channel to their basement and the basement flooded to within two feet of the ceiling. Their furnace is located in the basement along with some storage items such as tires.

A tributary to Prairie Creek from the north in the east portion of the city has an open channel for approximately three blocks. A block further north there are a couple small drainageways that get to Buchanan Street or U.S. Highway #136 and then go into storm sewers that presumably connect to the open channel downstream. Floodwater will pond on U.S. Highway #136 at this location from storms such as the Spring of 1985 to the extent that the road

needed to be closed for 1 or 2 hours. Another area of street ponding and road closure for 1 or 2 hours is near Buchanan and Fayette Streets. The city also noted that they had repaired a washout on Center Street from the spring of 1985 flooding.

There are a few homes along Prairie Creek with basements close enough to the creek to have them flood. The type of soil in the city is poorly drained and somewhat poorly drained and the area does not have many drainage ditches to outlet drains around basements. Even an apartment building, near the north tributary that could outlet a basement drainage system, has seepage and a wet basement problem. It is not that unusual for homes in Carthage to have wet basements, but most of them are not as the result of flooding.

Sewer backups may be a problem in some areas. An older resident along Prairie Creek stated that he has had backup problems to his basement two times in 60 years.

It was noted in some locations that storm sewers and sanitary sewers follow under or very close to the route of Prairie Creek. In the upper portion there were some breaks noted in the storm and sanitary sewer that has allowed Prairie Creek water to enter the sewer. In the Spring of 1985, floodwaters were higher than a sanitary sewer manhole allowing it to overflow into Prairie Creek.

Prairie Creek, in the past, has had some pollution problems from effluent of the Carthage sewage treatment plant. Whether these problems have been corrected is unknown. It still would have some pollution problems from the flooding of manholes along the creek.

There is no fishing pressure on Prairie Creek possibly because of its small size, intermittent flow and lack of game species. There has been no reported fish kills from the treatment facilities or pollution on Prairie Creek possibly because of this lack of suitability for fishing.

The City of Carthage has a dam, built in 1926 on a small tributary of Long Creek northwest of the city that is used for water supply. The Spring flood of 1985 caused some washing of the road near the water plant located near the dam. The State Water Survey wrote a report in 1953 dealing with the silting of Lake Carthage due to the erosion of agricultural land upstream. It noted that from 1926 to 1949 the surface area had been reduced from 39.7 acres to 36.1 acres and the volume from 406.3 acre-feet to 308.2 acre-feet. Since that report the City of Carthage raised the spillway level 2.5 feet on the main dam and built three siltation dams upstream. These siltation dams serve primarily as sedimentation basins but also serve as supplementary water supply, fishing, waterfowl usage, and hunting of waterfowl. These sediment basins or siltation ponds are rapidly filling with sediment and are acquiring excessive aquatic vegetation in their upper ends. Another sediment survey in 1962 showed that the reservoir capacity had been reduced by another 32.8 acre-feet since 1949. In 1981 the projected total silt accumulation in Carthage Lake and two ponds was 201.7

acre-feet. At present the Carthage Lake Dredging Project consists of dredging 240,000 cubic yards of sediment and building two lagoons for settling of the dredged material. This project will cost \$426,400 for the dredging and approximately \$127,000 for building the two lagoons plus \$18,000 for building a third lagoon at a later date. The lakes receive only light to moderate fishing for Bluegill, crappie, bullhead, or channel catfish. The abundant vegetation and light fishing has resulted in an overpopulation of Bluegill and crappie that in the past needed to be controlled. Recently a chemical that was applied to agricultural land was washed into the reservoir and resulted in a major fish kill. Near one of the siltation reservoirs a large amount of sediment was washed onto a road this spring that needed to be removed.

Along Prairie Creek it was noted that there were many trees of various sizes along the banks of the creek. There was also some erosion to the banks that eventually will cause these trees to be undermined and then fall in the creek. The reservoirs on Long Creek have trees growing very close to their embankment and in the case of the main dam of Lake Carthage may have some trees growing on the embankment. The main dam had some improvements in 1955 of which the spillway was raised 1.7 feet and it appeared that a concrete wall was added to the top of the dam. No close inspection of the concrete or spillway was made, but they should be inspected periodically to insure the structural integrity of the dam.

According to local residents, one of the largest floods occurred in 1973. The most recent was a rainfall of at least 5 inches (approximately 10-year frequency) in the spring of 1985.

New home construction in Carthage has been moderate in the past few years and will probably continue at about the same rate. No large growth potential is foreseen in the near future, and the population will remain about the same as present for the next few years. The city has identified an industrial park, but there is no activity in that area presently.

PROBLEM SUMMARY

Estimated average annual damages to the City of Carthage are listed below:

Number of Homes	Number of Businesses	Number of Garages & Sheds	Total Value	Average Annual Damages
8	3	13	\$545,000	\$5,900

Additional Problem due to wetness				
Yard damage - Debris Removal (Approximately 30)				\$1,000
Street and Road Repairs				1,600
Wet Basements				<u>1,500</u>
Total				\$4,100

Total estimated average annual damages for Carthage = \$10,000.

Flood damages start at the 5 year (20% chance) frequency storm.

EXISTING FLOODPLAIN MANAGEMENT

The City of Carthage has participated in the emergency phase of the National Flood Insurance Program since June, 1974. Business and home owners may purchase flood insurance. The city does require building permits and does have zoning ordinances in effect.

The existing Federal Insurance Administration Flood Hazard Boundary Map dated June 7, 1974, with a revision on October 3, 1975 is not complete. It is correct as far as it goes, but Prairie Creek extends further west and has a tributary to the north that is not noted. The ponding on U.S. Highway #136 is also not shown.

RECOMMENDATIONS

It is recommended that the City of Carthage continue to participate in the National Flood Insurance Program, and convert to the regular phase of the program as soon as possible.

The city should protect the sanitary sewer system from flooding along Prairie Creek. Breaks in the storm sewer system should be repaired along Prairie Creek so that the creek water doesn't enter into the system and overload it. The city should review the size of its storm sewer system along U.S. Highway #136 where the ponding occurs.

The city should adopt a channel and dam maintenance program. Implementation of this program will keep the channel free of trees, brush, and debris, while maintaining existing road culverts and openings for optimum flows. A dam inspection and maintenance program would provide for regular inspection of structural and vegetative appurtenances at the dams in Carthage's water supply system. The structural program would maintain the concrete, steel, and pipe portions of the dam to assure their proper functioning during a flood. The vegetative program would maintain the vegetative protection and control the unwanted vegetation such as trees growing on the earth fill embankment.

The city should work with the District Conservationist and the farmers upstream from the Carthage Dams to reduce the agricultural erosion that is

contributing sediment and chemicals to their reservoirs. This would prolong the life of the dams, better protect the fish, and improve the water quality.

The two auto dealers that flood along Prairie Creek should improve the floodproofing of their buildings. The Chrysler dealer, in particular, has a low water entry that floods their basement that should not be too hard to block off and thus reduce the number of times they flood.

Because of the poorly draining soils, the city should regulate or restrict the construction of crawl spaces, one-half, and/or full basements in the area where these conditions exist.

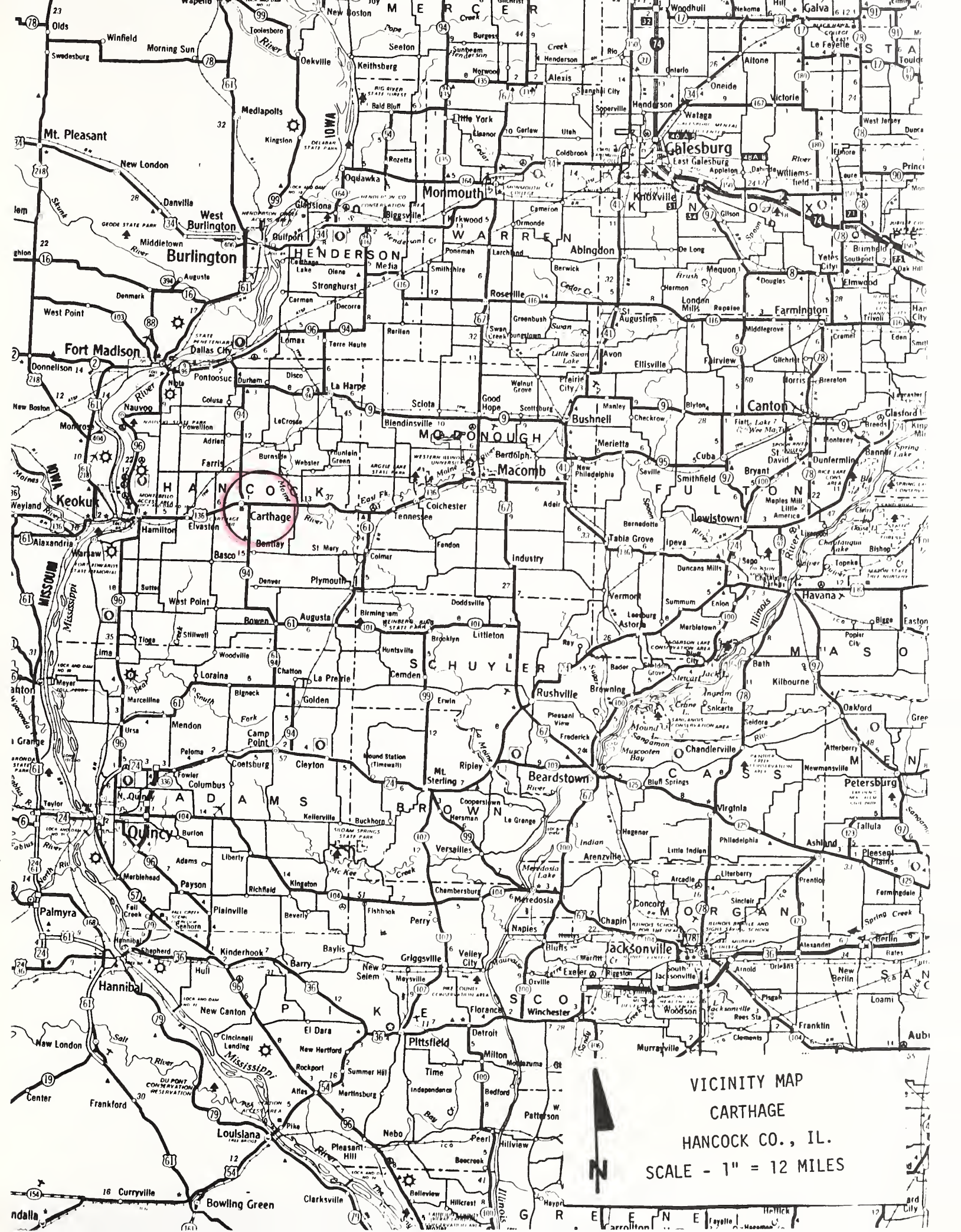
The southwest corner of the city has an existing trailer park and planned or zoned industrial park. Prior to the development of this industrial park, a plan for its drainage should be developed. If not, it would aggravate flooding on Prairie Creek through the city. Such a plan could involve improvement of Prairie Creek, on-site detention, diverting the drainage to the Bear Creek drainage area to the southwest or diverting the drainage to the Long Creek drainage area to the northwest.

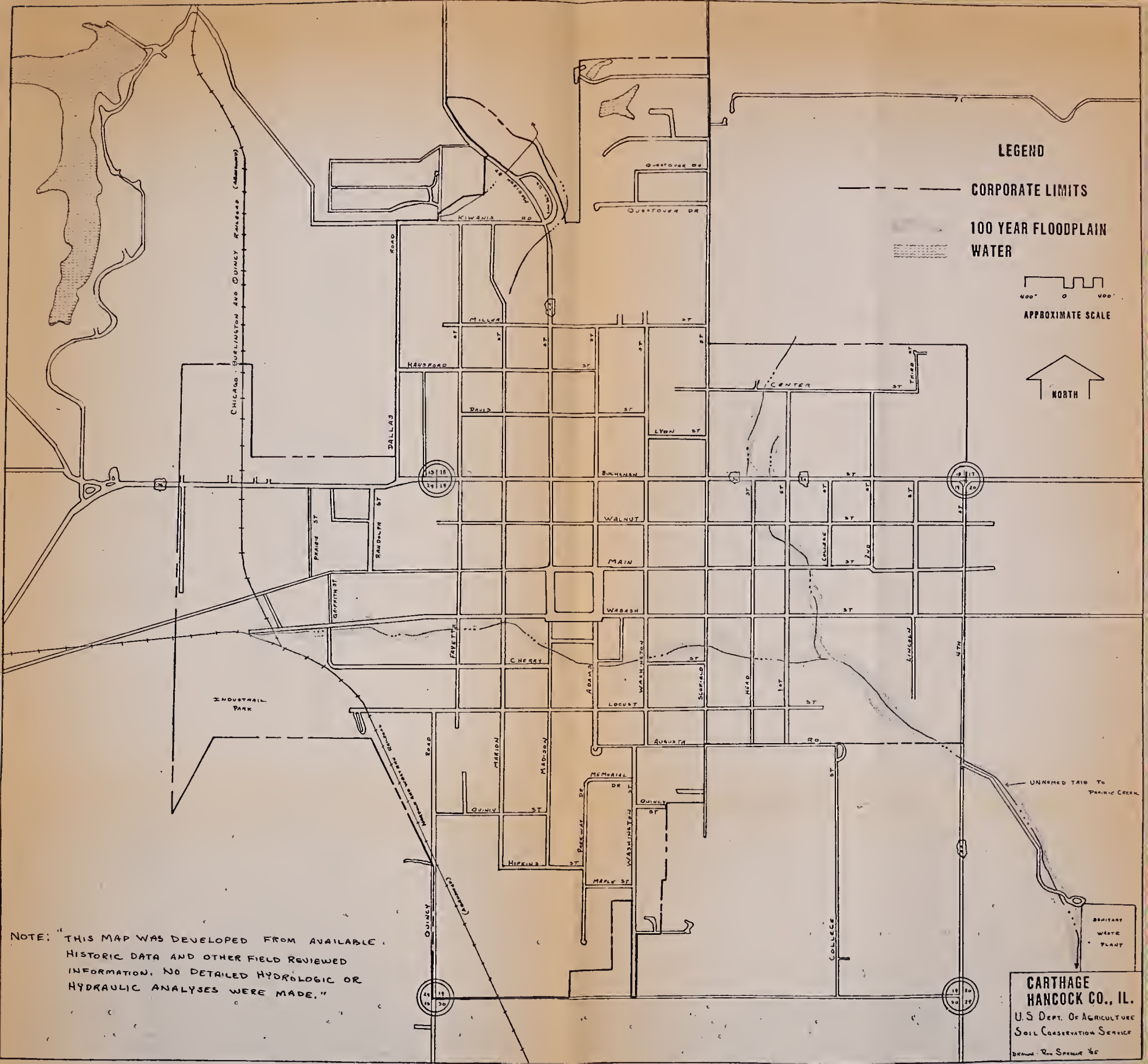
A low priority should be assigned for future detailed floodplain management studies in Carthage.

INVESTIGATION AND ANALYSIS

No additional calculations, discharges, or profiles were made as a part of this study. The inventory of flooding and water problems is based on a field review and interviews with local citizens. The Flood Hazard Boundary Map, along with interviews with local citizens, was used to determine the 100-year floodplain. Aerial photographs were provided by DWR. Damages were based on property value estimates during field review, and the application of damage factors. These factors came from previous detailed floodplain management studies.

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LEGEND

--- CORPORATE LIMITS

100 YEAR FLOODPLAIN
WATER



APPROXIMATE SCALE



NORTH

UNNAMED TRAIL TO
PRAIRIE CREEK

SEWAGE
WASTE
PLANT

CARTHAGE
HANCOCK CO., IL.
U.S. DEPT. OF AGRICULTURE
SOIL CONSERVATION SERVICE

DRAWN: R. S. SPENCE '65

NOTE: "THIS MAP WAS DEVELOPED FROM AVAILABLE
HISTORIC DATA AND OTHER FIELD REVIEWED
INFORMATION. NO DETAILED HYDROLOGIC OR
HYDRAULIC ANALYSES WERE MADE."



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